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Characteristics of the surface chemistry of linden pyrochar after removal of labile organic matter

Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© Published under licence by IOP Publishing Ltd. The changes of chemical properties of the pyrochar surface were studied in the laboratory experiment that simulated pedogenic transformation of pyrochar under the influence of soil biota. The native pyrochar samples were obtained by pyrolysis of linden wood residues at the temperature of 250°C, 450°C and 650°C. Their modified samples were obtained by removing an easily degradable pool of organic substances that can be used by microorganisms during the first months after application to the soil. In low-temperature linden pyrochar (250°C and 450°C) dominated carboxylic and phenolic surface groups, in high-temperature (650°C) - lactonic groups. After removal of readily decomposable organic substances the acidity of the phenolic and lactonic groups in pyrochar of low-temperature pyrolysis sharply decreased. Characteristic feature of all studied samples is the presence in IR spectra of absorption bands of gyroxyl, carbonyl, methylene groups and organosilicon polymers. The feature of IR spectra of linden pyrochar (250°C and 450°C) is the presence of absorption bands of the stretching vibrations of the tertiary alcohols and phenols C-O group.

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